



نگهداشت و افزایش تولید میدان نفتی بینک  
سطح الارض و ابنیه تحت الارض

خرید پکیج های کمپرسور گاز (رفت و برگشتی) بینک  
(قرارداد BK-HD-GCS-CO-0008\_03)



شماره پیمان:

۰۵۳ - ۰۷۳ - ۹۱۸۴

HYDROSTATIC/ PNEUMATIC TEST PROCEDURE

نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه
V02	0005	PR	QC	120	HY	GCS	BK

شماره صفحه : 1 از 11

طرح نگهداشت و افزایش تولید ۲۷ مخزن


HYDROSTATIC/ PNEUMATIC TEST PROCEDURE

نگهداشت و افزایش تولید میدان نفتی بینک

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	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض  خرید پکیج های کمپرسور گاز (رفت و برگشتی) بینک (قرارداد BK-HD-GCS-CO-0008_03)							
	شماره پیمان: ۰۵۳ - ۰۷۳ - ۹۱۸۴		HYDROSTATIC/ PNEUMATIC TEST PROCEDURE شماره صفحه : 2 از 11					
	پروژه BK	بسته کاری GCS	صادر کننده HY	تسهیلات 120	رشته QC	نوع مدرک PR	سریال 0005	نسخه V02

### REVISION RECORD SHEET




PAGE	V00	V01	V02	V03	V04
1	X	X	X		
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PAGE	V00	V01	V02	V03	V04
66					
67					
68					
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شماره پیمان: ۰۵۳ - ۰۷۳ - ۹۱۸۴	HYDROSTATIC/ PNEUMATIC TEST PROCEDURE							شماره صفحه : 3 از 11	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	HY	120	QC	PR	0005		V02

## TABLE OF CONTENT

1.	TABLE OF CONTENT.....	3
1.0	INTRODUCTION.....	4
2.0	GENERAL DEFINITION.....	4
3.0	SCOPE.....	5
4.0	REFERENCE .....	5
5.0	PREPERATION FOR TESTING.....	5
6.0	QUALLITY AND TEMPERATURE OF TEST WATER .....	5
7.0	ACCESSORIES FOR TEST.....	6
8.0	METHOD OF HYDROSTATIC PRESSURE TEST .....	6
9.0	METHOD OF HELIUM PNEUMATIC TEST FOR BARE BLOCK COMPRESSOR.....	8
10.0	STANDARD OF TEST PRESSURE.....	9
11.0	ATTACHMENT A, PRESSURE TEST REPORT.....	11

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شماره پیمان: ۰۵۳ - ۰۷۳ - ۹۱۸۴	HYDROSTATIC/ PNEUMATIC TEST PROCEDURE							شماره صفحه : 4 از 11	
	پروژه	بسته کاری	صادرکننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	HY	120	QC	PR	0005		V02

## 1.0 INTRODUCTION

Binak oilfield in Bushehr province is a part of the southern oilfields of Iran, is located 20 km northwest of Genaveh city.



With the aim of increasing production of oil from Binak oilfield, an EPC/EPD Project has been defined by NIOC/NISOC and awarded to Petro Iran Development Company (PEDCO). Also, PEDCO (as General Contractor) has assigned the EPC-packages of the Project to "Hirgan Energy - Design and Inspection" JV.

As a part of the Project, a New Gas Compressor Station (adjacent to existing Binak GCS) shall be constructed to gather of 15 MMSCFD (approx.) associated gases and compress & transfer them to Siahmakan GIS.

## 2.0 GENERAL DEFINITION

The following terms shall be used in this document.

CLIENT:	National Iranian South Oilfields Company (NISOC)
PROJECT:	Binak Oilfield Development – General Facilities
EPD/EPC CONTRACTOR (GC):	Petro Iran Development Company (PEDCO)
OWNER:	OWNER is collectively refer to National Iranian South Oil Company (NISOC) and Petro Iran Development Company (PEDCO)
EPC CONTRACTOR:	Joint Venture of: Hirgan Energy – Design & Inspection (D&I) Companies
VENDOR:	HAVAYAR Company
EXECUTOR:	Executor is the party which carries out all or part of construction and/or commissioning for the project.
THIRD PARTY INSPECTOR (TPI):	The firm appointed by EPD/EPC Contractor (GC) and approved by CLIENT (in writing) for the inspection of goods.
SHALL:	Is used where a provision is mandatory.
SHOULD:	Is used where a provision is advisory only.
WILL:	Is normally used in connection with the action by Client rather than by an EPC/EPD Contractor, supplier or Vendor.
MAY:	Is used where a provision is completely discretionary.

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شماره پیمان: ۰۵۳ - ۰۷۳ - ۹۱۸۴	HYDROSTATIC/ PNEUMATIC TEST PROCEDURE							شماره صفحه : 5 از 11	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	HY	120	QC	PR	0005		V02

### 3.0 SCOPE

This procedure prescribes the requirements for hydrostatic test of equipment at shop.

### 4.0 REFERENCE

- ASME Sec.VIII, Div.1, UG99b (36)
- API 618 – Clause 8
- ASME B31.3

### 5.0 PREPERATION FOR TESTING

- Before commencement of testing, make sure that all repair and NDT testing and field PWHT are complete according to inspection procedure.
- Inside and outside of equipment shall be cleaned from debris and foreign materials like paint, liquid, oil or other contaminants.
- Eliminate all needless items and clean the test space. only authorized persons are allowed for test.
- If the test needs some reinforcements, it must be a perfect form for safety inspection. supports and other items never contact with welded parts.

### 6.0 QUALITY AND TEMPERATURE OF TEST WATER

- Use the clean tap water, if test doesn't require special demand.
- The water to be used for the hydrotest of equipment shall be:
  - Potable water with chloride content for stainless < 30 ppm and for carbon steel <50 ppm if the equipment can be completely drained and water pockets / stagnations can be removed by rags.
  - Demineralized water with chloride content < 10 ppm when a complete drain is not possible.
- Temperature of hydrotest water is 60°F (16°C) ~ 120°F (48°C). Water temperature shall be measured before test by temperature gauge (TG).
- The test pressure will not pressurize until the temperature of test units and hydrotest water are at about the same. **This Temperature shall be checked using calibrated a temperature**

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شماره پیمان:  ۰۵۳ - ۰۷۳ - ۹۱۸۴	HYDROSTATIC/ PNEUMATIC TEST PROCEDURE							شماره صفحه : 6 از 11	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	HY	120	QC	PR	0005		V02



sensor/thermometer.

## 7.0 ACCESSORIES FOR TEST

- **Water pump:**
  - water pump flow: 3-5 kg/cm<sup>2</sup> per minute
- **Pressure Gauge:**
  - Dial indicating pressure gauges used in testing shall be graduated over a range of about double the intended maximum test pressure, but in no case the range shall be less than 1.5 nor more than 4 times that pressure.
  - Digital reading pressure gauges having a wider range of pressure may be used provided the readings give the same or greater degree of accuracy than that obtained by dial pressure gauges.
  - Pressure gauge for the pressure test shall be checked and calibrated within no longer than six (6) months prior to the test. Gauges shall be recalibrated at any time that there is a reason to believe that they are in error.
  - In case of the pressure test, at least 2 pressure gauge shall be attached on the equipment subjected to the pressure test. The calibration of gauges shall be confirmed by project inspector.
  - Pressure gauges shall be attached on the bottom and top of the test equipment subjected to the pressure test.
- **Blind flange**
- **Temperature indicator**
- **Hose**
- **Fitting**

## 8.0 METHOD OF HYDROSTATIC PRESSURE TEST

- 8.1 Vent will be provided at all high point of the test unit in the position in which it is to be tested to purge possible air pockets while the test unit is filling.
- 8.2 Test unit will be filled satisfactorily by the low-pressure hose.
- 8.3 Before pressurizing, hydrostatic pressure test workers must check the test equipment, if all low-pressure hoses and other appendages put on each other strongly which don't affect to test

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شماره پیمان: ۰۵۳ - ۰۷۳ - ۹۱۸۴	HYDROSTATIC/ PNEUMATIC TEST PROCEDURE							شماره صفحه : 7 از 11	
	پروژه	بسته کاری	صادرکننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	HY	120	QC	PR	0005		V02

pressure.

8.4 The design and test pressure of each test unit are according to the **Equipment summary** shown in **Table 1**.

8.5 The pressure test doesn't have to exceed 6 percent of the test pressure.

8.6 Weld zone should be cleaned before accurate inspection for pressure test.

8.7 Inspectors of quality control department have to check **for any leakage** during keeping the pressure and if there is a drop in pressure-by-pressure gauge.

8.8 If leakages or other defects are recognized at any stage of the hydrotest, the depressurization sequence shall be immediately initiated to the atmospheric pressure. If required, the equipment shall be emptied from the water to the extent required for performing repairs (Air vents shall be opened prior to emptying the equipment from the test medium). After repairing, again all the above steps shall be re - performed to continue the hydrotest.

8.9 After hydrostatic test, the pressure should be reduced slowly until the pressure gauge is zero.

8.10 Hydrostatic test is operated by worker of product department under the attendance of quality control department inspector and client and purchaser **& GC & EPC contractor**.

8.11 The inspector of QC department, shall record inspection documents and sign the test report (Attachment A), the director of QC department must recheck and approve the test reports.

8.12 Gaskets used during test of an assembled compressor frame shall be of the same design as supplied with the compressor frame.

8.13 After hydrostatic test, **prior to draining the water, the vents installed on the equipment shall be opened to avoid chance of vacuum and subsequent permanent deformation of the equipment** **Then** water must be **drained from** the test unit. After elimination water, air blowing shall be done.

8.14 After completion of the pressure test (and depressurizing the equipment to the atmospheric pressure), Then the test water in the equipment shall be fully drained and the equipment be given sufficient time in the fresh air to be dried out from any remaining test liquid prior to packing for shipment.

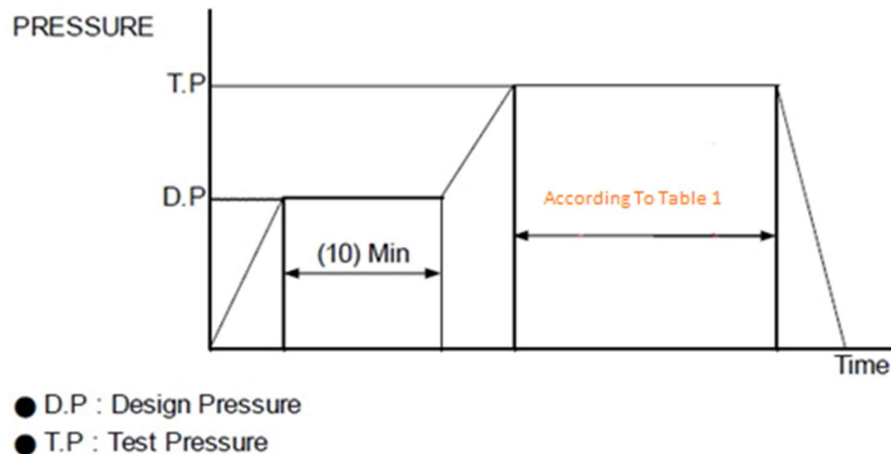
8.15 In order to prevent preparing water pool and problem during draining, it's necessary to lift drain gate window before evacuation of water. **During filling and draining, test unit has to be properly vented at the highest point.**

8.16 The tests shall be performed prior to the installation of the cylinder liner. Compressor cylinders shall be tested as assembled components using the heads, valve covers, clearance

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شماره پیمان: ۰۵۳ - ۰۷۳ - ۹۱۸۴	HYDROSTATIC/ PNEUMATIC TEST PROCEDURE							شماره صفحه : 8 از 11	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	HY	120	QC	PR	0005		V02

pockets, and fasteners to be supplied with the finished cylinder.

- 8.17 At the time of testing, the main/spare bolts and nuts and gaskets of the equipment shall not be used.
- 8.18 The hydrotest graph should be recorded by the recorder.
- 8.19 The hydrotest for all pressure part must be performed before painting.





Picture 1

## 9.0 METHOD OF HELIUM PNEUMATIC TEST FOR BARE BLOCK COMPRESSOR

- 9.1 The helium pneumatic test mainly conducts for checking the safety during operation.
- 9.2 The damage is serious in case the vessel is broken by the helium pneumatic test, so it will conduct after Checking the intensity by hydrostatic test.
- 9.3 Pressure will go up and down slowly.
- 9.4 The gas used in helium pneumatic test need to dry and clean water has to remove and make clean inside the vessel and welded point.
- 9.5 The gas temperature used in the helium pneumatic test has not to occur in danger of brittle fracture in specific units.
- 9.6 Test pressure must keep the design pressure.

pressure is risen up slowly to test pressure then, hold it during 30min.



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شماره پیمان: ۰۵۳ - ۰۷۳ - ۹۱۸۴	HYDROSTATIC/ PNEUMATIC TEST PROCEDURE							شماره صفحه : 9 از 11	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	HY	120	QC	PR	0005		V02




9.7 Inspect for leaks using soapy water and remove the soapy water completely after testing.

## 10.0 STANDARD OF TEST PRESSURE



- 10.1 For rotary equipment, as per API 618, Clause 8.3.2.1, hydrostatic test pressure is 1.5 times of design pressure. (MAWP will be considered as design pressure)
- 10.2 For fixed equipment, as per ASME Sec.VIII, Div.1, UG99b (36) hydrostatic test pressure is 1.3 times of design pressure.
- 10.3 For piping, as per ASME B31.3, Clause 345.4.2 (a) hydrostatic test pressure is 1.5 times of design pressure.

**TABLE.1: EQUIPMENT SUMMARY**



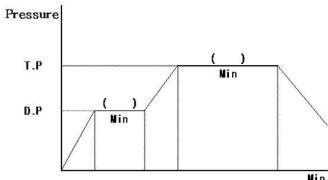
Row	Equipment Name	Tag Number	Design Pressure (Barg)	Design Temperature (°C)	Test Pressure (Barg)	Test Duration
1	1 <sup>st</sup> Suction SNUBBER	C-2101-D1 A/B/C	24.5	180	31.8	1 Hour
2	1 <sup>st</sup> Discharge Snubber	C-2101-D2 A/B/C	24.5	180	31.8	1 Hour
3	1st stage Cylinder	C-2101-D1 A/B/C	24.5	180	36.8	30 min.
4	2 <sup>st</sup> Suction SNUBBER	C-2102-D1 A/B/C	62	180	80.6	1 Hour
5	2nd stage cylinder	C-2102 A/B/C	62	180	93	30 min.
6	2st Discharge SNUBBER	C-2102-D2 A/B/C	62	180	80.6	1 Hour
7	Collecting Pot	V-2104 A/B/C	5	85	6.5	1 Hour
8	Collecting Pot	V-2105 A/B/C	5	85	6.5	1 Hour
9	Buffer Gas Filter	F-2101-BF A/B/C	10	85	13	1 Hour
10	Main Oil pump	P-2101-MP A/B/C	10	85	As per mfg. Standard	30 min.
11	Auxiliary Oil pump	P-2101-AP A/B/C	10	85	15	30 min.
12	Lube Oil Cooler	AE-2101-OC A/B/C	10	85	13	1 Hour
13	Lube Oil Filter	F-2101-OF	10	85	13	30 min.

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شماره پیمان: ۰۵۳ - ۰۷۳ - ۹۱۸۴	HYDROSTATIC/ PNEUMATIC TEST PROCEDURE							شماره صفحه : 10 از 11	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	HY	120	QC	PR	0005		V02

		A/B/C				
14	Main Water Pump	P-2101-WP A/B/C	10	85	15	30 min.
15	Auxiliary Water Pump	P-2101-AX A/B/C	10	85	15	30 min.
16	Water Air Cooler	AE-2101-WC A/B/C	10	85	13	1 Hour
17	Cooling Water Filter	F-2101/02-WF A/B/C	10	85	13	1 Hour
18	Strainer	ST-2101/02 A/B/C	7 / 24.5	180/180	9.1 / 31.85	1 Hour (for spool)
19	Heater	H-2101-WH A/B/C	-	85	Full water	30 min.
20	Water Reservoir	-	-	85	Full water	30 min.
21	Process piping	Class CN05	24.5	180	36.8	30 min.
22	Process piping	Class FN05	62	180	93	30 min.
23	Oil Piping	Stainless	10	85	15	30 min.
24	Water Piping	CWS/CWR	7	85	10.5	30 min.

	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض  خرید پکیج های کمپرسور گاز (رفت و برگشتی) بینک (قرارداد BK-HD-GCS-CO-0008_03)			
	شماره پیمان: ۰۵۳ - ۰۷۳ - ۹۱۸۴		HYDROSTATIC/ PNEUMATIC TEST PROCEDURE شماره صفحه : 11 از 11	
پروژه BK	بسته کاری GCS	صادر کننده HY	تسهیلات 120	رشته QC
		نوع مدرک PR	سریال 0005	نسخه V02

## 11.0 ATTACHMENT A, PRESSURE TEST REPORT

	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض خرید پکیج های کمپرسور گاز (رفت و برگشتی) بینک (قرارداد BK-HD-GCS-CO-0008_03)			
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Type of Test Hydrostatic Test <input type="checkbox"/> Pneumatic Test <input type="checkbox"/> Leakage <input type="checkbox"/>			M/o. No.:	
Job No.	Client Name:		Traveler /Oper. No.	Rev.
Item No.	Item Name:			
Proc. No.	Rev.	Inst. No.	Rev.	DWG. No.
Pressure Gauge		1	2	3
Identification No.				
Calibration Date				
	Design Pres. (Bar G.)	Test Pres. (Bar G.)	Test Temperature(°C)	Holding Time (Min.)
Requirement				Remarks
Actual Result				
Sketch: <div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>* PRESSURE TEST OF ( )</p> <p>* ( ) SIDE</p> <p>* M/O No. :</p> <p>D.P.: Design Pressure T.P.: Test Pressure</p> </div> </div>				
HAVAYAR	TPI	HE/DI	PEDCO	NISOC
Vendor	Third Party Ins.	EPC Contractor	EPD/EPC Contractor(GC)	Client
Name & Sign:	Name & Sign:	Name & Sign:	Name & Sign:	Name & Sign:
Date:	Date:	Date:	Date:	Date: